Extreme Temperature, Rad-Hard Power Management ASIC, Phase I

Completed Technology Project (2010 - 2010)

Project Introduction

Ridgetop Group will design a rad-hard Application Specific Integrated Circuit (ASIC) for spacecraft power management that is functional over a temperature range of -230 to +130

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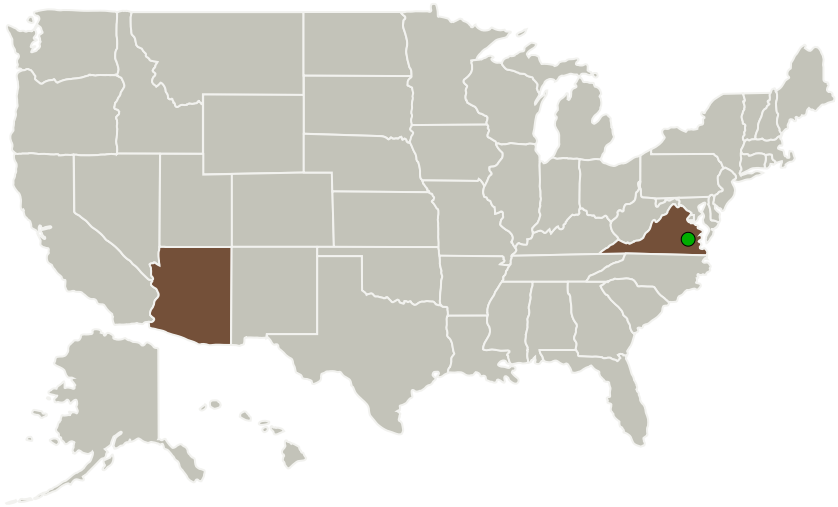
C. This ASIC is intended to work in conjunction with a Fuel Cell power system and battery back-up to provide uninterrupted power to critical modules in Space. Ridgetop will combine Radiation Hardening (RH) techniques with Large Scale Integration (LSI) methodologies to build a power management system for spacecraft applications onto a single monolithic circuit. The significance of this innovation is a single reliable component (ASIC) that will meet platform requirements for high voltage, wide operating temperature range, and radiation tolerance (minimum 100 krads Total Ionizing Doze (TID), 100 MeVcm2/mg Single Event Latchup (SEL). During phase 1, we will select two functional blocks from within a representative NASA power management system as test cases. Designs for these blocks will be developed and validated through SPICE circuit and radiation simulations, using technology files provided by a commercial foundry. In phase 2, Ridgetop will deliver working prototype integrated circuits (ICs) that meet and exceed the above requirements.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Ridgetop Group, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Tucson, Arizona
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Arizona	Virginia

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140614)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Ridgetop Group, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

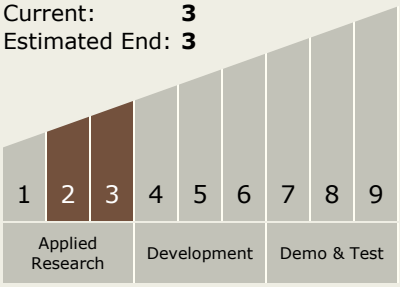
Carlos Torrez

Principal Investigator:

Ronald Carlsten

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  - TX02.1 Avionics Component Technologies
    - TX02.1.6 Radiation Hardened ASIC Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System